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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/939,651	08/28/2001	Li Li	M4065.0159/P159-B	5524

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EXAMINER

TRAN, BINH X

ART UNIT

PAPER NUMBER

1765

DATE MAILED: 01/14/2003

6

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/939,651

Applicant(s)

LI ET AL.

Examiner

Binh X Tran

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 August 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 92-108 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 92-108 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.5, 2
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 92 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In line 4 and line 8 of claim 92, "said chamber" lack antecedent basis. The examiner suggests replacing "said chamber" with --said reactive chamber--.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 92, 97-101, 106 are rejected under 35 U.S.C. 102(b) as being anticipated by Wang et al. (US 6,074,959).

Wang discloses a method for etching an oxide layer comprising:

placing a substrate having an oxide layer (24) formed over the substrate into the reactive chamber;

generating a plasma of the etching gas at a first power level and contacting said oxide layer of the substrate with the first power level for the first predetermined time (Table 2-4 step 1);

generating a plasma of the etching gas at a second power level in the reactive chamber and contacting the oxide layer with the second power level plasma for a second predetermined time to etch the oxide layer, wherein the first and the second power levels are different (Table 2-4, step 2).

Respect to claim 97-98, Wang discloses the second power level is about 950 watt (col. 11, table 2). Respect to claims 99-100, Wang discloses the second etch time is about 40 second (Table 2) or 60 second (col. 12 lines 14-15). Respect to claim 101, Wang discloses the etching gas for first and second plasma is selected from the group consisting of argon (i.e. inert gas),  $\text{CH}_2\text{F}_2$  (example 8, col. 9) or  $\text{CHF}_3$  (col. 7 line 4-6). Respect to claim 106, Wang discloses the substrate is a silicon-based substrate (col. 7 lines 42-43).

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 93-96 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang in view of Jain et al. (US 6,180,533).

Claims 93-96 differ from Wang by the specific value of power level. In a silicon oxide etching method, Jain discloses the specific power value and etching time are a result effective variable. Jain further discloses the power level is from about 25-150 Watts (Table 1, within applicant range). The result effective variables are commonly determined by routine experiment. The process of conducting routine experiments so as to produce an expected result is obvious to one of ordinary skill in the art. Hence, it would have been obvious to one having ordinary skill in the art, at the time of invention, to perform routine experiment to obtain optimal etching time and power level as an expected result.

7. Claims 102-104 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang in view of Stinnett et al. (US 6,355,557).

Respect to claims 102-104, Wang fails to disclose the etching plasma is formed of  $\text{CF}_4$ ,  $\text{CHF}_3$  and Ar. However, Wang clearly disclose the use of hydro-fluorocarbon, fluorocarbon and argon. In an oxide etching method, Stinnett discloses the use of  $\text{CF}_4$ ,  $\text{CHF}_3$  and Ar (Table 1). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Wang in view of Stinnett by using  $\text{CF}_4$ ,  $\text{CHF}_3$  and argon because equivalent and substitution of one for the other would produce an expected result.

8. Claims 102-105 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang in view of Yang et al. (US 6,426,016)

Respect to claim 102-105, Wang fails to disclose the etching plasma is formed of either  $\text{CF}_4$ ,  $\text{CHF}_3$ , Ar or  $\text{CF}_4$ ,  $\text{CHF}_3$ , He. However, Wang clearly discloses the use of

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hydro-fluorocarbon, fluorocarbon and inert gas such as argon. In an oxide etching method, Yang disclose the use of  $\text{CF}_4$ ,  $\text{CHF}_3$ , Ar or  $\text{CF}_4$ ,  $\text{CHF}_3$ , He (col. 5 lines 5-15). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Wang in view of Yang by using  $\text{CF}_4$ ,  $\text{CHF}_3$ , argon or  $\text{CF}_4$ ,  $\text{CHF}_3$ , He because equivalent and substitution of one for the other would produce an expected result.

9. Claims 107-108 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang in view of Yamazaki et al. (US 6,489,632).

Respect to claims 107-108, Wang fails to disclose that the substrate is a germanium substrate or gallium arsenide substrate. However Wang clearly discloses the substrate is made of semiconductor material such as silicon-base material. In a semiconductor method, Yamazaki discloses that the substrate can be either silicon-base material or germanium or gallium arsenide (col. 13 lines 48-53). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Wang in view of Yamazaki by utilizing germanium substrate or gallium arsenide substrate because equivalent and substitution of one for the other would produce an expected result.

### ***Conclusion***

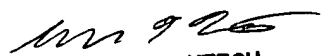
10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Binh X Tran whose telephone number is (703) 308-1867. The examiner can normally be reached on Monday-Thursday and every other Friday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin L Utech can be reached on (703) 308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Binh X. Tran  
January 8, 2003

  
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